UC-7122/7124

Hardware User's Manual

www.moxa.com/product

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UC-7122/7124

Hardware User's Manual

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1

Introduction

The UC-7122/7124 Series of mini size RISC-based ready-to-run embedded computers come with the WinCE operating system pre-installed. The embedded computers have dual 10/100 Mbps Ethernet ports and 2 or 4 RS-232/422/485 serial ports in an ARM9 box. In addition, the UC-7122 and UC-7124 have an internal SD socket and one USB 2.0 host port for storage expansion, to provide high performance communication and unlimited storage in a super compact, palm-size box. The UC-7122 and UC-7124 are the right solutions for embedded applications that use a lot of memory, but that must be housed in a small physical space without sacrificing performance.

This chapter covers the following topics:

- **Overview**
- **Package Checklist**
- **Product Features**
- **Product Hardware Specifications**
- **Hardware Block Diagrams**
  - UC-7122
  - UC-7124

Overview

The UC-7122/7124 embedded computers come with 2 or 4 RS-232/422/485 serial ports and dual 10/100 Mbps Ethernet LAN ports to provide users with a versatile communication platform, making these RISC-based embedded computers ideal for your embedded applications.

The UC-7122/7124 embedded computers use the Cirrus Logic EP9302 ARM9 200 MHz RISC CPU. Unlike the X86 CPU, which uses a CISC design, the ARM9's RISC design architecture and modern semiconductor technology provide the UC-7122/7124 with a powerful computing engine and communication functions, but without generating too much heat. Moreover, the built-in 16 MB NOR Flash ROM and 32 MB SDRAM give you enough storage capacity to run applications on the UC-7122/7124. The additional SD socket provides the flexibility for storage expansion, and the dual LAN ports built into the ARM9 make the UC-7122/7124 ideal communication platforms for simple data acquisition and protocol conversion applications. In addition, the RS-232/422/485 serial ports allow you to connect a variety of serial devices. Taken together, these features ensure that the UC-7122/7124 embedded computers are convenient and powerful central control units for industrial applications, such as data acquisition, remote device control and monitoring, and protocol conversion.

Package Checklist

UC-7124-CE

Mini RISC-based, Ready-to-Run Embedded Computer with Dual LANs, 4 Serial Ports, SD, USB, WinCE 5.0

UC-7122-CE

Mini RISC-based, Ready-to-Run Embedded Computer with Dual LANs, 2 Serial Ports, SD, USB, WinCE 5.0

UC-7124-CE-T

Mini RISC-based, Ready-to-Run Embedded Computer with Dual LANs, 4 Serial Ports, SD, USB, WinCE 5.0

UC-7122-CE-T

Mini RISC-based, Ready-to-Run Embedded Computer with Dual LANs, 2 Serial Ports, SD, USB, WinCE 5.0

NOTE: "-T" indicates wide temperature model.

Each model is shipped with the following items:

- 1 UC-7122/7124 embedded computer
- Quick Installation Guide
- Document & Software CD
- 100 cm RJ45-to-RJ45 Ethernet cross-over cable
- CBL-4PINDB9F-100: 100 cm console port cable, 4-pin header to female DB9
- Universal Power Adaptor
- Product Warranty Statement

Optional Accessories

- 35 mm DIN-rail mounting kit (DK-35A)

NOTE: Please notify your sales representative if any of the above items are missing or damaged.

Product Features

The UC-7122/7124 embedded computers have the following features:

- Cirrus Logic EP9302 ARM9 32-bit 200 MHz processor
- 32 MB on-board RAM
- 16 MB built-in flash memory
- RS-232/422/485 serial ports with software selectable interface
- Baudrates between 50 and 921.6Kbps; supports ANY BAUDRATE
- Dual 10/100 M Ethernet for backup networking
- SD card slot for storage expansion
- LED indicators for status, serial transmission
- Ready-to-run WinCE platform
- Easy DIN-rail or wall mounting
- Fanless design for increased ruggedness
- -40 to 75°C wide temperature models available

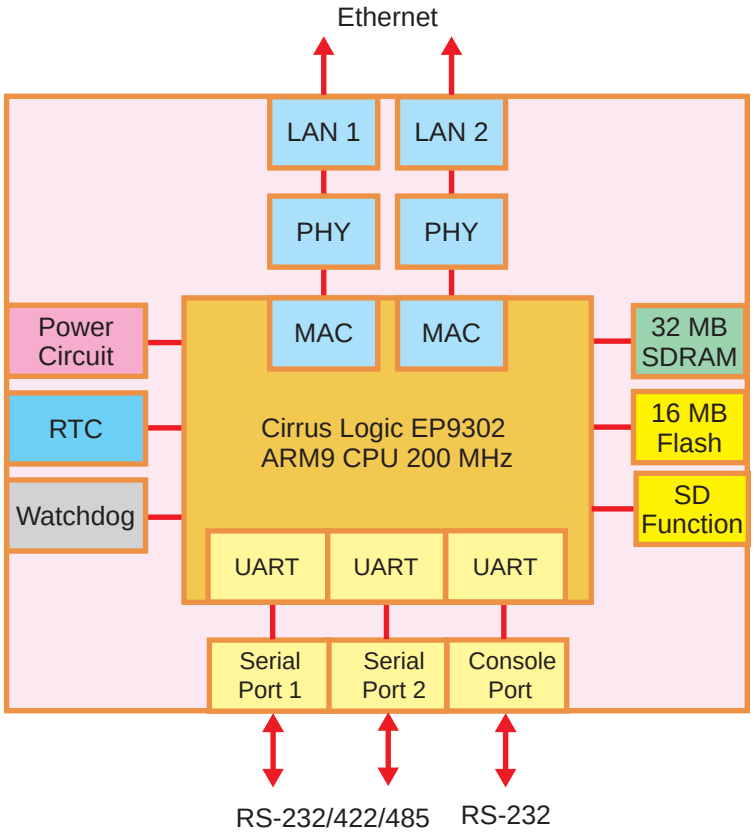
Product Hardware Specifications

System	
CPU	Cirrus Logic EP9302 ARM9 RISC CPU, 200 MHz
RAM	32 MB
Flash	16 MB
Storage Expansion	SD slot
USB	USB2.0 host x 1
Console port	RS-232 x 1 (TxD, RxD, GND), 4-pin header output, "115200, n, 8, 1"
Button	Reset button x 1; supports "Reset to Factory Default"
Other	RTC, buzzer, Watchdog Timer
OS	Built-in WinCE 5.0
Network Communication	
LAN	10/100 Mbps RJ45 x 2, auto-sensing
Protection	1.5 KV built-in magnetic isolation protection
Serial Communication	
Serial Ports	UC-7122: RS-232/422/485 male DB9 x 2
	UC-7124: RS-232/422/485 male DB9 x 4
Protection	15 KV built-in ESD protection for all signals
Data bits	5, 6, 7, 8
Stop bit(s)	1, 1.5, 2
Parity	None, Even, Odd, Space, Mark
Flow Control	RTS/CTS, XON/XOFF, RS-485 ADDC™
Speed	50 bps to 921.6Kbps; supports ANY BAUDRATE
LEDs	
System	Ready, SD activity
LAN	10M/Link, 100M/Link (RJ45 connector)
Serial	TxD, RxD
Power Requirements	
Power Input	12 to 48 V

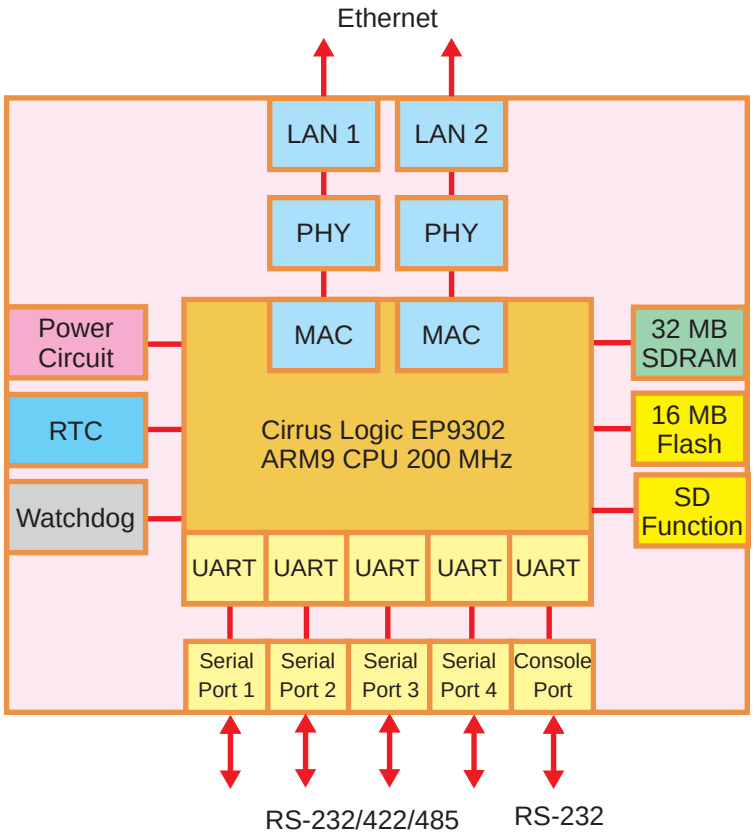
Power Consumption	(without USB device plugged in) UC-7122: 340 mA @ 12 VDC UC-7124: 360 mA @ 12 VDC
Mechanical	
Dimensions (W x D x H)	UC-7122/7124: 77 x 111 x 26 mm (without wall mount ears)
Construction Material	UC-7122/7124: aluminum, 1 mm
Mounting	DIN-rail, wall
Environment	
Operating Temperature	-10 to 60°C (14 to 140°F), 5 to 95% RH -40 to 75°C (-40 to 167°F) is optional for –T models
Storage Temperature	-20 to 80°C (-4 to 176°F), 5 to 95% RH -40 to 85°C (-40 to 185°F) is optional for –T models
Regulatory Approvals	
EMC	FCC, CE (Class A)
Safety	UL, cUL
Others	RoHS, CRoHS, WEEE
Warranty	**5 years**

Hardware Block Diagrams

UC-7122



UC-7124


Ethernet
LAN 1
LAN 2
PHY
PHY
MAC
MAC
Power Circuit
RTC
Watchdog
Cirrus Logic EP9302
ARM9 CPU 200 MHz
32 MB SDRAM
16 MB Flash
SD Function
UART
UART
UART
UART
UART
Serial Port 1
Serial Port 2
Serial Port 3
Serial Port 4
Console Port
RS-232/422/485
RS-232

2

Hardware Introduction

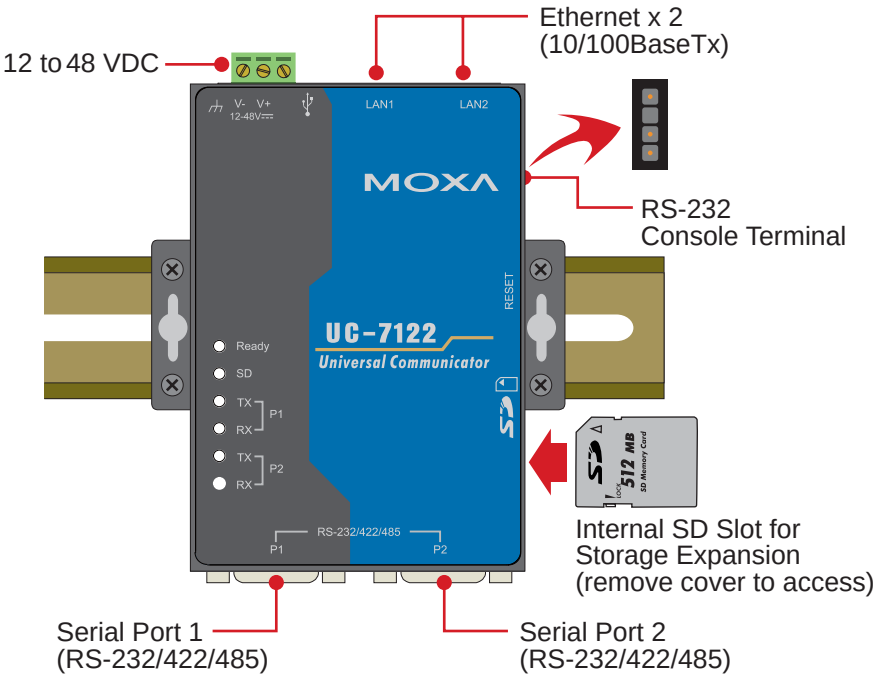
The UC-7122/7124 embedded computers are compact, well-designed, and built rugged enough for industrial applications. The small pocket size of the computers makes them suitable for a variety of operating environments. LED indicators help you monitor the performance and identify trouble spots, and the reliable hardware platform allows you to devote your attention to developing your application. In this chapter, learn the basics about the embedded computer hardware and its different parts.

This chapter covers the following topics:

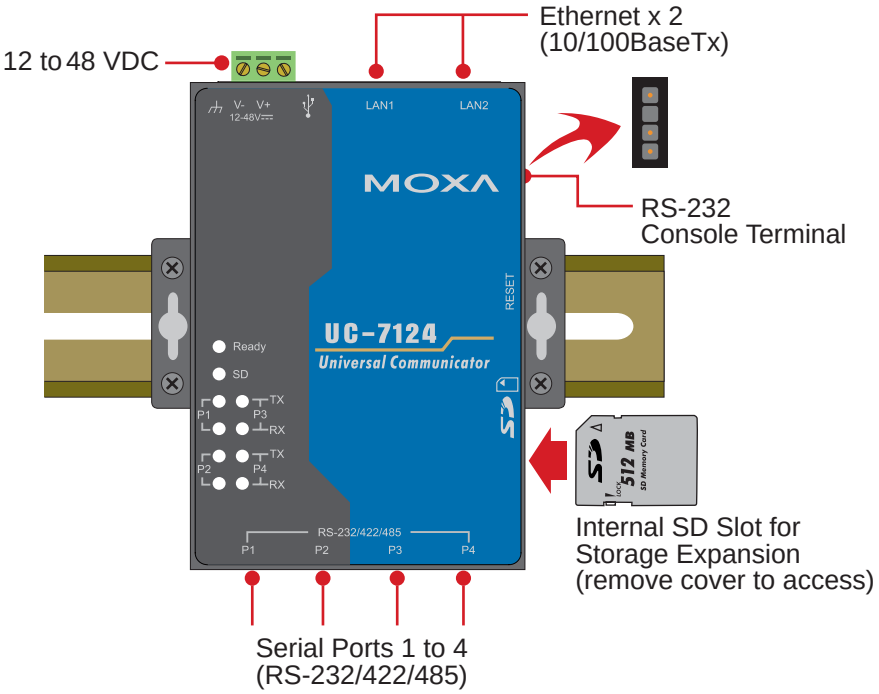
- **Appearance**
  - UC-7122
  - UC-7124
- **Dimensions**
  - UC-7122
  - UC-7124
- **LED Indicators**
- **Reset Button**
- **Real Time Clock**

Appearance

UC-7122

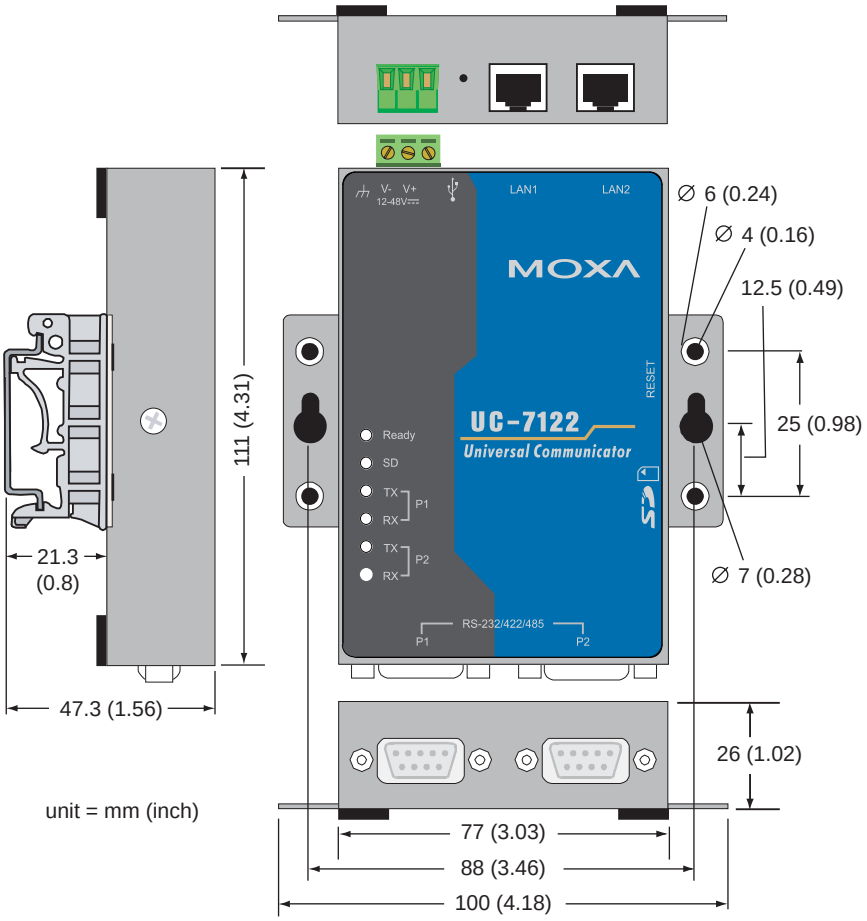


UC-7124

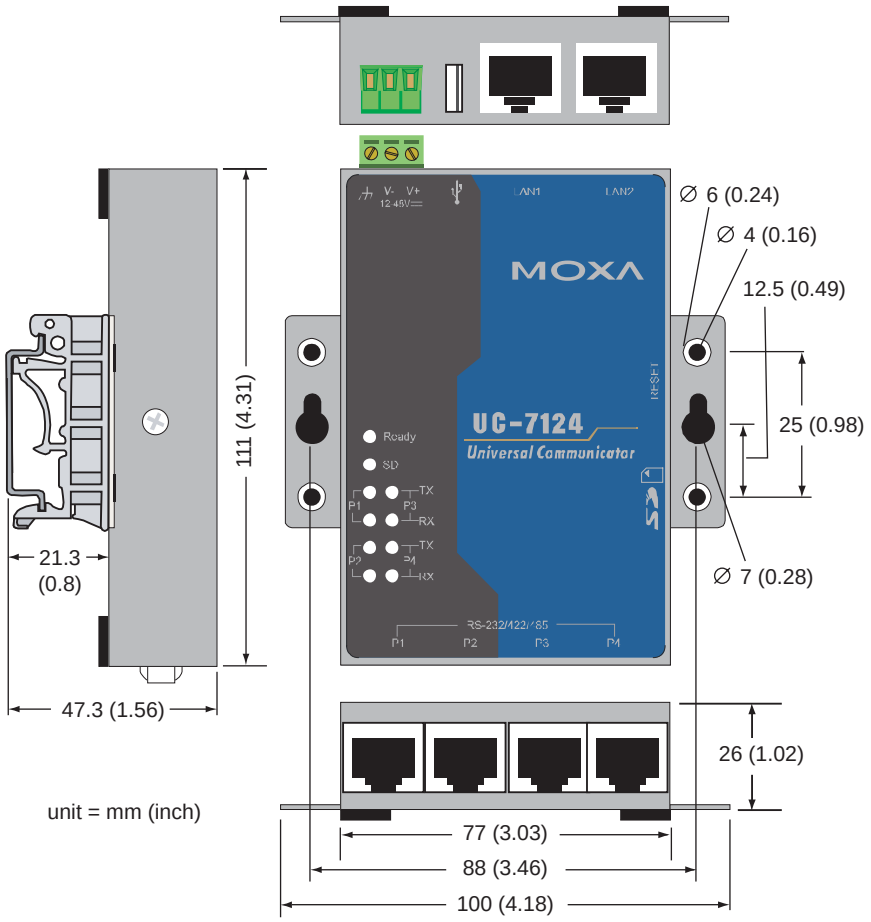


Dimensions

UC-7122



UC-7124



LED Indicators

LED Name	LED Color	LED Function
Ready	Green	Power is on and functioning normally
	Off	Power is off or there is another power error
SD	Green	SD card is detected
	Off	No SD card is detected
LAN	Orange	10 Mbps Ethernet link
	Green	100 Mbps Ethernet link
	Off	Disconnected or short circuit
TxD P1-P4*	Green	Serial ports P1-P4 transmitting data*
	Off	Serial ports P1-P4 not transmitting data*
RxD P1-P4*	Yellow	Serial ports P1-P4 receiving data*
	Off	Serial ports P1-P4 not receiving data*

*Note that the TxD and RxD LEDs on the UC-7122 display port 1 and port 2 (P1/P2) status only.

Reset Button

Hold the reset button down for 5 seconds to load the factory default configuration. After loading the factory defaults, the system will reboot automatically. We recommend that you use this function only if the software is not working properly.

The reset button is NOT designed as a hard reboot for the embedded computer.

ATTENTION

Restoring default settings preserves your data

Resetting the embedded computer to factory defaults will NOT format the user directory and will NOT erase the user's data. The reset button only loads a configuration file.

Real Time Clock

The embedded computer's real-time clock is powered by a lithium battery. We strongly recommend that you do NOT replace the lithium battery yourself. If the battery needs to be changed, please contact the MOXA RMA service team for assistance.

ATTENTION

There is a risk of explosion if the wrong type of battery is used. To avoid this potential danger, always be sure to use the correct type of battery. Contact the MOXA RMA service team for battery replacement.

CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.
DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

3

Hardware Connection Description

The UC-7122/7124 embedded computers support different types of connections. Dual Ethernet and multiple serial interfaces are built into every model, including a serial console port for monitoring bootup messages. The UC-7122/7124 also support an SD card for storage expansion, and USB ports that can be used to add external hard drives. The pre-installed WinCE 5.0 operating system provides powerful development tools that allow you to develop custom applications for remote operation of your device at low cost. In this chapter, learn how to connect the embedded computer to the network and to various devices.

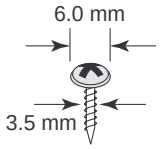
This chapter covers the following topics:

- **Installing the UC-7122/7124**
  - Wall or Cabinet Mounting
  - DIN-Rail Mounting
- **Wiring Requirements**
  - Connecting the Power
  - Grounding the Unit
- **Connecting Data Transmission Cables**
  - Conneting to the Network
  - Conneting to a Serial Device
  - Connecting to a Serial Console Port
- **Installing an SD card for Storage Expansion**
- **USB Port**

Installing the UC-7122/7124

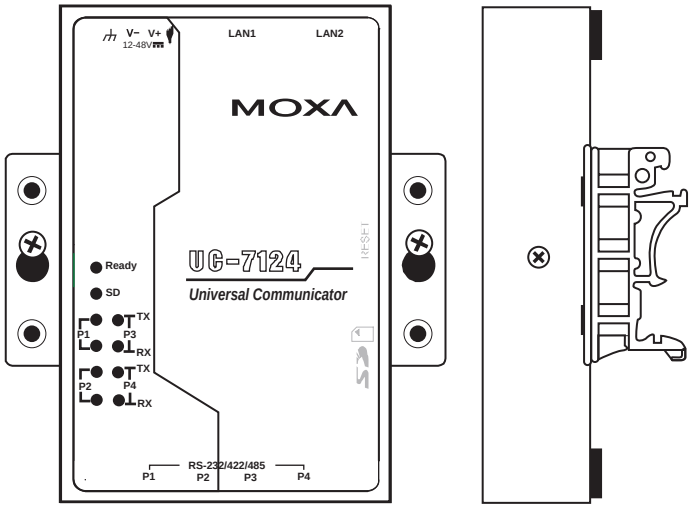
Wall or Cabinet Mounting

The UC-7122/7124 have built-in "ears" for attaching the embedded computers to a wall or the inside of a cabinet. We suggest using two screws per ear to attach the UC-7122/7124 to a wall or cabinet. The heads of the screws should be less than 6.0 mm in diameter, and the shafts should be less than 3.5 mm in diameter, as shown by the figure at the right.



DIN-Rail Mounting

DIN-rail attachments can be purchased separately to attach the product to a DIN-rail.



Wiring Requirements

This section describes how to connect serial devices to the embedded computer.

You should heed the following common safety precautions before proceeding with the installation of any electronic device:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.

  NOTE: Do not run signal or communication wiring and power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.

- Use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separate.
- It is advisable to label the wiring to all devices in the system.

ATTENTION

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your embedded computer.

Wiring Caution!

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.

If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

Temperature Caution!

Be careful when handling the unit. When the unit is plugged in, the internal components generate heat, and consequently the outer casing may feel hot to the touch.

Connecting the Power

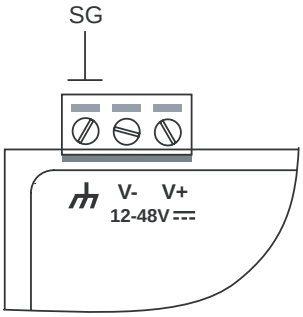
The DC source should be from a UL Listed Class 2 or Limited Power Source (LPS), external adaptor with output rated at 12 to 48 VDC, 1.2 A minimum. If the power is properly supplied, the "Ready" LED will glow a solid green after a 25 to 30 second delay.

Grounding the Unit

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Before connecting any devices, run a ground wire from the ground screw to the grounding surface.

ATTENTION

This product should be mounted to a well-grounded mounting surface such as a metal panel.



SG: The ***Shielded Ground*** (sometimes called Protected Ground) contact is the left most contact of the 3-pin power terminal block connector when viewed from the angle shown here. Connect the SG wire to an appropriate grounded metal surface.

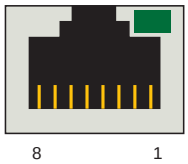
Connecting Data Transmission Cables

This section describes how to connect the embedded computer to the network, serial devices, and serial COM terminal.

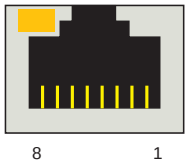
Connecting to the Network

Plug your network cable into the embedded computer's Ethernet port. The other end of the cable should be plugged into your Ethernet network. When the cable is properly connected, the LEDs on the embedded computer's Ethernet port will glow to indicate a valid connection.

The 10/100 Mbps Ethernet LAN port uses 8-pin RJ45 connectors. The following diagram shows the pinouts for these ports.



The LED indicator in the upper right corner glows a solid green color when the cable is properly connected to a 100 Mbps Ethernet network. The LED will flash on and off when Ethernet packets are being transmitted or received.



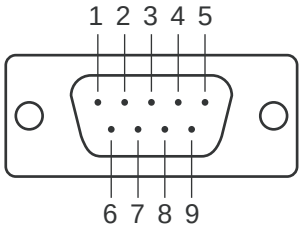
The LED indicator in the upper left corner glows a solid orange color when the cable is properly connected to a 10 Mbps Ethernet network. The LED will flash on and off when Ethernet packets are being transmitted or received.

Pin	Signal
1	ETx+
2	ETx-
3	ERx+
4	---
5	---
6	ERx-
7	---
8	---

Connecting to a Serial Device

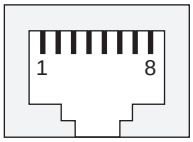
Use a serial cable to plug your serial device into the embedded computer's serial port. The two serial ports on the UC-7122 use male DB9 connectors and are labeled P1 and P2. The four serial ports on the UC-7124 use RJ45 connectors and are labeled P1, P2, P3, and P4. All of the serial ports can be configured by software for RS-232, RS-422, or RS-485 communication. The pin assignments are shown in the following two tables:

DB9 Male Port (UC-7122)



Pin	RS-232	RS-422	RS-485 (4-wire)	RS-485 (2-wire)
1	DCD	TxDA(-)	TxDA(-)	---
2	RxD	TxDB(+)	TxDB(+)	---
3	TxD	RxDB(+)	RxDB(+)	DataB(+)
4	DTR	RxDA(-)	RxDA(-)	DataA(-)
5	GND	GND	GND	GND
6	DSR	---	---	---
7	RTS	---	---	---
8	CTS	---	---	---

RJ45 (UC-7124)

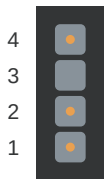


Pin	RS-232	RS-422	RS-485
1	DSR	---	---
2	RTS	TxD+	---
3	GND	GND	GND
4	TxD	TxD-	---
5	RxD	RxD+	Data+
6	DCD	RxD-	Data-
7	CTS	---	---
8	DTR	---	---

Connecting to the Serial Console Port

The serial console port is a 4-pin pin-header RS-232 port. It is designed for serial console terminals, which are useful for viewing boot up message.

Serial Console Port & Pinouts



Pin	Signal
1	TxD
2	RxD
3	NC
4	GND

NC=Not Connected

Serial Console Cable

Installing an SD Card for Storage Expansion

The UC-7122/7124 provide an SD slot for storage expansion. The SD slot allows users to plug in a Secure Digital (SD) memory card compliant with SD standard V1.0 for up to 1 GB of additional memory space. The following steps show you how to install an SD card in the UC-7122/7124.

The SD slot is located on the right side of the UC-7122/7124 enclosure. To install an SD card, you must first remove the protective cover to access the slot, and then plug the SD card directly into the slot.

Step 1: Use a screwdriver to remove the screws holding the SD card slot's outer cover.

Step 2: After removing the cover, insert the SD memory card into the slot.

NOTE: To remove the SD card from the slot, press the SD card in slightly with your finger, and then remove your finger to cause the card to spring out partially. You may now grasp the top of the card with two fingers and pull it out.

USB Port

The UC-7122/7124 has one USB port that supports USB 2.0 host. The USB port is used to connect an external flash disk to the embedded computer.